UNITED NATIONS
ECONOMIC
AND
SOCIAL COUNCIL

LIMITED
WRD/MKG/INF/L.150
19 April 1965
ENGLISH
ORIGINAL : ENGLISH

UNITED NATIONS

ECONOMIC COMMISSION FOR ASIA AND THE FAR EAST.

Committee for Coordination of Investigations
of the Lower Mekong Basin.
(Cambodia, Laos, Thailand and Viet-Nam)

REPORT ON THE FIELD TRIP

to

KHEMARAT, PAKSE DAMSITES

by

S. Ichiura
H. Hori
Thaipuck Thammongkol

Report on the field trip to Khemarat, Pakse and Tributary Damsite

by

S. Ichiura
H. Hori
Thaipuck Thammongkol

I. INTRODUCTION AND ACKNOWLEDGEMENT

The purpose of this field trip is to make the final decision of Khemarat and Pakse damsites where Mr. Allen H. Nicol, consulting engineering geologist to ECAFE, and Mr. S. Ichiura visited in flood season of October 1964. They proposed a few alternative damsites and suggested the necessity of another field trip in the dry season to investigate and to confirm the lower part of the riverbed and the foundation rock for final decision of the damsites. (c.f. WRD/MKG/INF/L.140 and WRD/MKG/INF/L.139).

On our way to these damsites, we also visited two tributary projects namely Lam Dom Noi and Nam Mune sites.

We express our sincere thanks to the National Energy Authority, the Government of Thailand, who generously provided us jeeps for land transportation between Ubol, Khemarat and Ban Dan; aluminum boat for river trip; and other necessary assistances.

2. ITINERARY

Thur. 18.3.65	1st day	Left Bangkok 9.00 by air Arrived Ubol 11.00 Visit NEA and District Office. Stay at Ubol
Fri. 19.3.65	2nd day	Left Ubol 6.00 by jeep Arrived Khemarat 9.30 Visit three alternative damsites by boat Stay at Khemarat.
Sat. 20.3.65	3rd day	Left Khemarat 7.00 by jeep Arrived Ubol 10.30 Left Ubol 12.30. Arrived Lam Dom Noi 15.00 Stay at Ubol
Sun. 21.3.65	4th day	Left Ubol 06.00 by jeep Arrived Ban Dan 12.30 Visit Pakse upper, lower and Nam Mune sites by boat Stay at Ban Dan.

/Mon

Mon.	22.3.65	5th day	Left Ban Dan 07.30 Arrived Ubol 14.00 Left Ubol by train 16.00
Tues.	23.3.65	6th day	Arrived Bangkok 06.00

3. KHEMARAT DAMSITES

No. 1: This is located at 28 km downstream of Khemarat District or 7 km upstream of Ban Na Sai where we launched the aluminum boat. It is the original damsite proposed by Japanese investigation team in its comprehensive reconnaissance report of 1961. On the right bank (Thai side) we found out crops of sound sand stone bed at the lower river bank which extends up to about EL135 m where the ground height would be high enough to build EL130 m reservoir. On the left bank where we were unable to approach there is also good outcrops on the lower left bank and it can be easily estimated that upper part of the bank will have enough height and suitable foundation. In the middle of the river channel there are two rows of rock outcrop which might be utilized for foundation for diversion wall during construction.

There will be, however, two problems in adopting this damsite. The one is geological problem as pointed out by Mr. A.H. Nicol in his report (cf. WRD/MKG/INF/L.139, page 11) and the other is width of the river channel.

In this area northwest strike and northeast dip of the bed is prevailing. In this damsite, as mentioned in the Mr. Nicol's report, "the river flows parallel to the strike of the bed and the axis of the dam will cross a series of beds having dissimilar engineering properties and there is a strong possibility that the bearing capacities of the foundation beds will vary greatly from bed to bed. This condition will create difficulties in the design of a concrete dam. There is furthermore the possibility of leakage along bedding planes".

The width of the river at EL130 m is approximately 600 m, this length will not be enough for the spillway, power house and navigation lock, and will need considerable excavation to construct the whole structure.

No. 2. This alternative site is located 4 km downstream of damsite No. 1 in this site favourable upstream dipping of bedding plane is available. There are highly exposed rock outcrops on both sides of the river bank, therefore the river forms a very narrow and deep channel during dry season in this area, which might cause the diversion and construction of the dam difficult. Rock outcrops

/are

are generally loosely bedded and seem fragile, and the elevation of both banks is comparatively low by Canadian map which may necessitate longer crest length (more than 1,000 m) and more concrete volume than other alternative sites.

No. 3. This site is located at about 3 km upstream of No. 1 damsite where the Mekong river bends about 180 degrees. There is a big rapid close to upstream side of this site called Phalakai rapid and also a small tributary called Ban Nouan joins near upper left bank.

From geological standpoint this site is favourable because of upstream bedding formation like No. 2 damsite.

We could confirm the right bank by landing Thai side that the outcrop of sand stone looks good enough and the abutment has sufficient height for the proposed dam. Some outcrops of foundation rock in the river channel are exposed near the center which shows that the foundation rock may not be deep in the river channel. There is a natural diversion channel on the right bank where a part of flood flow is discharged. This natural channel will be profitably utilized as the diversion channel during construction.

The left bank, Lao side, has more gentle slope and the height of the bank looks lower than the right bank, which is clear by Canadian maps. However foundation rock looks very sound and has little seams. Crest length at the elevation 130m will be long enough but not too long for the dam, power house and shiplock. There is a suitable site for power house at Lao side. In conclusion, this site does not have any remarkable shortcomings as Khemarat damsite.

Conclusion and recommendations

There exist some problems in No. 1 damsite as already stated, whereas No. 2 and No. 3 sites have more favourable geological features and topographies as well. Comparing No. 2 and No. 3 sites the topography of the letter is more favourable.

We conclude because of the above mentioned reasons that the No. 3 damsite is the most favourable one among three alternatives. However we should like to recommend to undertake more detailed topographical and geological investigations of No. 3 damsite before the final design will be made.

Pakse damsite

Downstream damsite (No. 1 damsite)

The Pakse downstream damsite is located at 6 km downstream of the Nam Mune

/confluence

confluence or 8 km downstream of Ban Dan District near Thai-Lao border line. This site is also proposed by the Japanese investigation team as the Pakse damsite. River channel at elevation 108 m will be around 800 m wide, which might be enough for building the spillway, the power house and the lock. Although no outcrop of foundation rock is visible near the right river bank, there is good foundation rock exposed about 100 m apart from the edge of the river on the right bank. We could not confirm the outcrop of foundation rock on the left bank. It might be difficult to estimate the depth of the silt overburden of both banks though small rock outcrop are visible close to downstream area of the damsite on the right bank.

Upstream damsite (No. 2 damsite)

The upstream damsite is situated one km upstream of Ban Dan District Office. Rock outcrops are visible from the boat on both banks from river water surface up to the top of banks. Good rock foundation is available on the right bank near elevation 108 m which is the elevation of proposed full reservoir. Width of river banks near this elevation is about 650 m which might be extended without difficulties by excavation of necessary because the topography of both banks looks comparativoly flat at 110 m elevation. As a damsite, this may be more favourable than downstream site.

CONSLUSION AND RECOMMENDATIONS

Further detailed geological and topographical survey should be carried out which will enable planning engineer more detailed and practical layout of the two projects. From surface observationsthe upstream damsite (No. 2 damsite) bears more favourable features than downstream one, however the latter has a great advantage of eliminating the Nam Mune project and save considerable amount of investment.

It is recommended that further investigation of the Pakse and Nam Mune project should be impelmented from various points of view, not only from engineering aspect but also from economical and social stand point.